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The Influence of Self-Regulation, Resilience, and Family Environment on Mathematics Learning Outcomes of Junior High School Students in Serang City, Indonesia

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Abstract

This study aimed to identify and analyze self-regulation that mediates the influence of resilience and family environment on students' mathematics learning outcomes. This descriptive research uses the method of explanatory survey with a quantitative approach. The variables in this study were mathematics learning outcomes (Y), resilience (X1), family environment (X2), and self-regulation (Z). Learning outcomes are the dependent variable (endogenous variable). At the same time, resilience and family environment are independent variables (exogenous variable), and self-regulation is a mediating variable (intervening variable) with questionnaires and observations to collect data. This study's population was all class VII students at State Middle School in Serang City, while the sample was randomly selected from as many as 332 students. The collected data is then analyzed using a structural equation model. The results of this study indicate that (i) there is a significant effect of resilience on mathematics learning outcomes, (ii) there is a significant effect of the family environment on student learning outcomes, (iii) there is a significant effect of self-regulation ability on mathematics learning outcomes (iv) there is a significant effect of resilience on students' abilities self-regulation (v) there is a significant influence of the family environment on self-regulation abilities (vi) there is a significant effect of resilience on student learning outcomes through self-regulation abilities (vii) there is a significant influence of the family environment on student learning outcomes through self-regulation abilities (viii) there is a significant influence resilience, family environment, and ability to self-regulate on mathematics learning outcomes. The results of this study imply that the concepts of resilience, family environment, and self-regulation are relevant and can estimate student learning outcomes.

Keywords: Resilience, Family Environment, Self-Regulation, Mathematics Learning Outcomes

INTRODUCTION

Teaching and learning activities have become half a part of student life. A student's firm and strong attitude in dealing with learning periods is one of the components of success in learning outcomes. One factor that influences learning outcomes is internal factors such as resilience. Resilience is a student's ability to cope with academic demands, stress, and school-related learning pressures, manifested by internal and external factors (Mwangi et al., 2015). Resilience can also be interpreted as a person's ability to face obstacles, pressure, and other difficult situations in overcoming academic problems. Resilience significantly affects student learning outcomes (Layco, 2020).

Previous research has shown that resilience significantly affects school and student life, including learning outcomes (Chen et al., 2022; Lau & Williams, 2022; Ramasubramanian et al., 2022). The level of resilience can affect the ability to think to improve learning outcomes in the classroom ('Athiyah et al., 2020; Ramadani & Muhandaz, 2021; Sari & Untarti, 2021). Mathematical resilience also plays a role in influencing students' mathematics learning

outcomes. If students' mathematical resilience abilities are high, student learning outcomes will also be increased (Iman & Firmansyah, 2019).

Apart from resilience, there is a positive and significant influence on parents' attention to students' mathematics learning outcomes (Marbun, 2021). A family environment that pays good attention to their children's education and is supported by high student interest in learning impacts children's enthusiasm for learning so that students can quickly achieve satisfactory learning results (Utaminingtyas et al., 2020).

The family environment in the form of parental attention, family member relations, and home atmosphere and family economic conditions have an active role in supporting learning outcomes (Sarah et al., 2021), which includes the influence of parenting styles on student learning outcomes in mathematics (Nasir & Widiyono, 2022). As much as 77.8% of students agreed that this family environment factor supports the external condition (Andri et al., 2020). The attention factor of parents also causes students to have difficulty in learning, and this is because children do their problems that are difficult at home without any help from parents. This phenomenon related to external factors that cause students to have difficulty learning mathematics shows that the role of parents cannot be separated from children's learning achievements. The role of parents in children's learning can be a supporting factor; on the other hand, it can be an inhibiting factor. Therefore, there is a need for parents' awareness to always provide attention and support in the child's learning process. Learning difficulties experienced by students with low learning outcomes require special attention from the school and family. Maximum assistance and supervision of study time from parents will help overcome student learning difficulties (Asriyanti & Purwati, 2020).

Students with indications of learning difficulties in mathematics only sometimes receive attention from their parents at home. One reason parents pay less attention to their children is the financial status of the household. Parents of students are typically employed as laborers; this they are not always present when their children study at home. Parents drop their kids off at school in the morning and return to work in the evening, leaving them exhausted. As a result, parents are less inclined to support their children's at-home learning activities, which are solely covered by the school (Utari et al., 2019).

Resilience capabilities and family environmental factors that influence student learning outcomes depend as well as self-regulation abilities. Learning outcomes are suggested to be achieved through self-regulation strategies, such as clarifying learning objectives and monitoring the learning process, which is then given reflection (Yan, 2020). In the learning process, students use their mental abilities to learn mathematics. So that the affective, cognitive,

and psychomotor skills that have been taught using teaching materials become detailed and strengthened (Hasan et al., 2021).

Self-regulation affects students' mathematics learning outcomes (Sholiha et al., 2022). Middle school students' self-regulation affects 40% of mathematics learning outcomes (Arsyad et al., 2022), and 79.6% positively affects junior high school mathematics learning outcomes (Nurfa & Quraisy, 2021). The higher the independence, the higher the students' mathematics learning outcomes (Larasati et al., 2020).

The ability of high self-regulation to understand mathematical concepts is better than moderate and low self-regulation, whereas there is no difference between middle and low self-regulation (Wahyuni et al., 2019). Self-regulation in junior high school students is still deficient in achieving their desired learning goals and making them successful in their studies (Febriyanti & Imami, 2021).

The ultimate goal of learning activities is to have learning outcomes to determine the level of student mastery of the subject matter after carrying out the learning process (Sihaloho et al., 2018; Haryadi & Pujiastuti, 2022). According to Gagne (1975), learning outcomes can be intellectual skills that allow a person to interact with his environment through symbols, emblems, ideas, and cognitive strategies. Siregar & Sari (2020) added that interaction is a discrepancy factor in achieving student learning outcomes. Learning outcomes are essential for education, teachers, students, and researchers (Al-Zoubi & Younes, 2015; Al-Ansi & Al-Ansi, 2023; Lafifa et al., 2023).

From initial observations of a group of students in the city of Serang, it was found that 85% of students had learning outcomes below the criteria for achievement of learning objectives. Student learning outcomes usually depend on general cognitive abilities, such as working memory, processing speed, and rational reasoning, which have been shown to play an essential role in achieving learning outcomes (Banjarnahor et al., 2018; Rochani, 2016; Sulistiyono et al., 2021; Wardana & Rifaldiyah, 2019). Several factors that affect student learning outcomes are divided into microsystem and macrosystem factors. Microsystem factors consist of the inner characteristics of students and the nature of their direct interactions with other people, such as teachers and other students.

This research was inspired by previous research by Machmud & Ramadhan (2022), which suggested researching other variables. This research explores and identifies the relationship between student learning outcomes by utilizing key variables or predictors related to these outcomes. To fix the problem, all parties must collaborate to find a solution, and it is essential to solve the problem of substandard student learning outcomes as soon as possible. Therefore,

issues regarding student learning outcomes that could be more optimal need to be resolved through initial investigations that seek to discover the factors that cause these problems.

METHOD

This descriptive study employs a quantitative method in an explanatory survey. The goal of explanatory research is to identify causal linkages to determine why an event occurs. In this way, through hypothesis testing, descriptive investigations can identify causes (post-fact research) and consequences (experimental research).

The variables in this study were mathematics learning outcomes (Y), resilience (X1), family environment (X2), and self-regulation (Z). Learning outcomes are the dependent variable (endogenous variable), while resilience and family environment are independent variables (exogenous variable), and self-regulation is a mediating variable (intervening variable).

According to Gumanti et al., (2016), surveys often use test results or questionnaires, surveys in the world of education filled out by respondents, and attitude scales. Researchers who use this model will usually try to collect large-scale data on selected samples that can represent the population as closely as possible so that by using a certain degree of statistical confidence to say with a measure of statistical confidence observe specific characteristics occur with a degree of regularity or that factors certain things group together or they are related to each other, or they change over time or location.

The place for this research was the Public Junior High School Environment in Serang City, Serang City, Banten Province, Indonesia. The population of this study was all students of Class VII State Junior High School in Serang City. The technique of random cluster sampling took the school sample. For taking samples of students, simple random sampling techniques to select students after the number of sample schools is known.

After the school sample is obtained, the next step is to determine the student sample. The selection of students in this study was taken from class VII students of State Junior High Schools in Serang City who had previously been selected as the school sample. Calculation of the student sample was carried out using the Slovin formula.

Estimate the number of samples from each school using a proportional allocation formula with a sample of each stratum according to the proportion of each stratum. Random samples proportionally according to stratification or proportionate stratified random sampling. The sampling is described in Table 1.

Table 1. Sample public junior high schools and 7th-grade students in Serang City

No	Name School	Address	Amount Student	Student Sample
1	Public Junior High School A	Cipocok Jaya	359	72

No	Name School	Address	Amount Student	Student Sample
2	Public Junior High School B	Taktakan	257	52
3	Public Junior High School C	Kasemen	338	68
4	Public Junior High School D	Walantaka	308	62
5	Public Junior High School E	Serang	243	49
6	Public Junior High School F	Curug	144	29
	Total			332

The research action scenario begins with the operationalization of the variables that researchers will use, then the operationalization of the variables studied can be seen in Table 2.

Table 2. Variable operationalization

Variable	Indicator	Size	Scale
Endogenous Variables			
Learning Outcomes (Y)	PAS scores of Class VII public junior high school students in mathematics.	Students who score above the criteria for achieving learning objectives and those who score below the criteria.	Interval
Intervening (Mediator)			
Self-regulation (Z)	1. Personal function. 2. Behavioral function. 3. Environment function.	To measure self-regulation, the indicators used are: 1. Personal function level of ability to plan for students to achieve learning goals, manage time, and complete activities related to goals. 2. Behavioral function level of students' ability to evaluate themselves for the progress of the work done, ability to survive, and more enthusiasm in learning and completing learning targets. 3. Environment function level of students' ability to choose and create physical environmental conditions to facilitate learning.	Interval
Exogenous			
Resilience (X1)	Seven resilience indicators according to Reichich K. & Shatte: 1. Emotion regulation 2. Impulse control. 3. Optimism 4. Ability to analyze problems. 5. Empathy 6. Self-efficacy 7. Achievement	Original instrument resilience measurement using the Resilience Quotient (RQ) Test from Reivich and Shatte (2002): 1. The level of student attitudes creates positive emotions to focus on doing something that is not influenced by emotional conditions. 2. The impulse level of student attitude rejects anything that can distract from doing the task. 3. Optimism is the level of student confidence in what has been done for success in the future. 4. The level of student attitudes identifies and solves the problem	Interval

Variable	Indicator	Size	Scale
		5. Empathy level of understanding of others. 6. The level of attitude of students believes they can do many things well. 7. The attitude level of students like to try new things.	
Family Environment (X2)	1. How parents educate 2. Relations between families 3. Home atmosphere 4. Family economic situation 5. Parent's attention 6. Cultural background	1. The level of student attitudes regarding the way parents educate them. 2. The level of student attitudes toward relationships with all family members (parents and siblings) 3. The level of students' attitudes about the house's atmosphere when studying 4. The level of student attitudes regarding the family's economic situation, work, and parents' income 5. The level of students' attitudes toward parents' understanding while studying 6. The level of student attitudes regarding culture and habits in the family	Interval

The resilience questionnaire was consulted with two experts before being tested on students. Next, the researcher asked for consideration and validation of 2 validators with medium-high results. Testing the validity of the questionnaire was conducted on 34 respondents with an accuracy level of 5%, and degrees of freedom (df) n-2 was obtained = 34-2 = 32, so the value obtained t_{table} of 0.339. Thus, each statement of the family environment variable questionnaire can be declared valid if each statement item has t_{count} greater than t_{table} ($t_{count} > t_{table}$). There are 34 valid and five invalid statements for resilience questionnaire testing in research. Family environment questionnaire tests have 33 valid statements and three invalid statements, and self-regulation questionnaire tests have 23 valid statements. That is, valid questionnaire statements can be used to measure what will be measured. As for the reliability of the three variables in the empirical validity test, the reliability values of resilience, family environment, and regulation were 0.926, 0.925, and 0.885, respectively.

The collected data is processed and analyzed using analysis Structural Equation Modeling (SEM) assisted software Partial Least Square. According to Harahap (2018), Structural Equation Modeling (SEM) is a collection of statistical techniques that allow testing a series of relatively complex relationships that linear regression equations cannot solve. SEM involves three (3) simultaneous activities: path analysis, which tests the relationship model between

variables, confirmatory factor analysis, which verifies the validity and reliability of the instrument, and structural and regression analysis, which provides a suitable model for prediction.

Benefits of intelligent PLS One of the factors is the limited quantity of samples required for the analysis. Because the method of bootstrapping or random multiplication is used, the data does not need to have a normal distribution to test formative and reflective SEM models with different indicator measurement scales in one model. This is possible regardless of the scale's form (category ratio, Likert, etc.).

RESULTS AND DISCUSSION

The outer loading score can be used to measure validity indicators, and an indicator is considered valid if its outer loading value is greater than 0.70 (> 0.70). When the Minimum Criterion is met, the Average Variance Extracted (AVE) value is greater than 0.50 (> 0.50). The variable can be considered legitimate even if the outer loading value in the test is less than 0.70. This is because the indicator can still be used as long as the minimum loading value is greater than 0.40 (loading > 40) and the AVE value is greater than 0.50 (AVE > 0.5). It needs to be eliminated if the value is less than 0.40. The validity indicators are displayed in Table 3.

Table 3. Validity indicators (outer loadings) and convergent validity (AVE)

Leave variable	Indicator	Loading (>0.60)	AVE(>0,5)
X1 Resilience	X1.1	0.743	0.557
	X1.2	0.729	
	X1.3	0.793	
	X1.4	0.708	
	X1.5	0.600	
	X1.6	0.814	
	X1.7	0.815	
X2 Family Environment	X2.1	0.550	0.535
	X2.2	0.812	
	X2.3	0.844	
	X2.4	0.694	
	X2.5	0.845	
	X2.6	0.582	
Z Self Regulation	Z.1	0.875	0.742
	Z.2	0.874	
	Z.3	0.834	
Y Learning Outcomes	Y	1.000	1.000

The outer loading score can be used to measure validity indicators, and an indicator is considered valid if its outer loading value is greater than 0.70 (> 0.70). When the Minimum

Criterion is met, the Average Variance Extracted (AVE) value is greater than 0.50 (> 0.50). The variable can be considered legitimate even if the outer loading value in the test is less than 0.70.

This is because the indicator can still be used as long as the minimum loading value is greater than 0.40 (loading > 40) and the AVE value is greater than 0.50 (AVE > 0.5). It needs to be eliminated if the value is less than 0.40. The validity indicators are displayed in Table 3.

Table 4. Construct Reliability (Cronbach's Alpha and Composite Reliability)

Variable Laten	Cronbach's Alpha	Composite Reliability
X1 Resilience	0.866	0.897
X2 Family Environment	0.822	0.870
Y Learning Outcomes	1.000	1.000
Z Self-Regulation	0.826	0.896

Table 4 shows that all variables have Cronbach's Alpha values better than 0.70. Value Composite Reliability is higher than 0.70 for all factors. Using the computation results as a basis, determine construct reliability (Cronbach's Alpha and Composite Reliability). Based on Cronbach's Alpha calculations, every variable satisfies the requirements. The outcomes of the composite reliability, outer loading, and AVE calculations all satisfied the requirements. These factors allow for the study model to be used for additional testing.

Testing discriminant validity is done to prove whether indicators on a construct will have a loading factor that is larger on the construct it forms than the loading factor with another construct. This can be known through value-baker-paints criteria or using the values in the table cross-loadings (Hair et al., 2017). In this study, the value from the table is used as the baker-paints criteria. Table 5 shows the discriminated validity and former-lacker criteria.

Table 5. Discriminated validity and former-lacker criteria.

Variable laten	X1	X2	Y	Z
X1 Resilience	0.746			
X2 Family Environment	0.061	0.731		
Y Learning Outcomes	0.454	0.223	1	
Z Self-Regulation	0.345	0.268	0.356	0.861

Based on the results of the concurrent validity test in Table 5, information on the value of the correlation relationship between variables in each latent construct can be obtained, which has a higher value when compared to the correlation between other variables contained in this study. So, there is no multicollinearity problem between latent variables.

Collinearity in assessment: By taking the VIF value into account, the structural model and the formative measurement model share the same notion. The VIF number needs to be below 5.0. This shows that all predictors of all responses in the model are free of multicollinearity symptoms, allowing testing to proceed to the next level (Hair et al., 2017). Table 6 shows the collinearity assessment VIF.

Table 6. Collinearity assessment VIF

Variable laten	Y Learning Outcomes	Z Self-Regulation
X1 Resilience	1.137	1.004
X2 Family Environment	1.079	1.004
Z Self-Regulation	1.22	

Table 6 shows that each construct variable's VIF value is less than 5.0 (<5.0). The VIF value indicates that none of the variables exhibit multicollinearity symptoms and can be used for additional study.

The accuracy of forecasts (estimations) is measured using the coefficient of determination. According to Hair et al. (2017), the R-value of 0.75 is typically regarded as having a substantial prediction accuracy, the R2 of 0.50 as having an estimate of moderate accuracy, and the R2 of 0.25 as having a low estimation value accuracy. Table 7 displays the coefficient of determination results.

Table 7. The coefficient of determination (R^2)

Variable laten	R^2	R^2 Adjusted
Y Learning Outcomes	0.272	0.265
Z Self-Regulation	0.180	0.175

Based on Table 7, the R2 model estimation Y Learning Outcomes 0.272 accuracy can be seen. Based on this value, it has an estimation of moderate accuracy. In other words, X_1 Resilience, X_2 Family Environment, and Z Self-Regulation affect 27.2%, while other factors outside the research model influence the remaining 72.8%. R model estimation accuracy^2 Z Self-Regulation 0.180. Based on this value, it has a low accuracy prediction. In another word X_1 Resilience, X_2 Family environment influences Z self-regulation by 18% while other factors outside the research model influence the remaining 82%.

A value known as Stone-Geisser Q2, or Q2, is another metric of prediction accuracy that researchers might employ in addition to the magnitude of the R value2. This value is produced by blindfolding the technique. A value of 0.02 is regarded as having little predictive relevance, 0.15 as having moderate predictive relevance, and 0.35 as having strong predictive relevance when calculating the relative measure of predictive relevance (Hair et al., 2017).

Table 8. Predictive relevance (Q2).

Variable Laten	SSO	SSE	Q^2 (=1-SSE/SSO)
X1 Resilience	2324	2324	
X2 Family Environment	1992	1992	
Y Learning Outcomes	332	247.983	0.253

Variable Laten	SSO	SSE	Q^2 (=1-SSE/SSO)
Z Self-Regulation	996	871.105	0.125

Based on the test results in Table 8, the Q value can be obtained^2 as predictive relevance for the constructive model Variable Y Learning Outcomes influenced X_1 resilience, X_2 family, and Z self-regulation of 0.253 and classified as having moderate predictive relevance. Q value^2 predictive relevance for the constructive model variable Z influenced self-regulation X_1 resilience, X_2 family environment of 0.125 and classified as having small predictive relevance. As for evaluating the value of R^2 of all endogenous variables using f^2, the difference between f^2 with R^2 is f^2 is more specific on each exogenous variable. In general, a value of 0.02 is considered to affect small, 0.15 has affect size of moderate, and 0.35 has big (Hair et al., 2017). The affect size f2 can be seen in Table 9.

Table 9. Affect size f^2

Variable laten	Y Learning Outcomes	Z Self-Regulation
X1 Resilience	0.176	0.132
X2 Family Environment	0.029	0.075
Z Self-Regulation	0.038	

The F value for the constructive model of variable X_1 Resilience can be determined based on the test findings in Table 9. Resilience impacts the variable Y Learning Outcomes by 0.176 and is categorized as having a modest estimation value. Variable Z self-regulation is impacted by the value of f^2, which influences size for the constructive model of variable X1 resilience by 0.132 and is categorized as having a minor estimation value. The variable Y Learning Outcomes is affected by the f^2 impact size of the constructive model of the variable X_2 family environment by 0.029, and this effect size is categorized as having a small estimation value. The constructive model of variable X_2 family environment influences variable Z self-regulation of 0.075 and is classed based on the value of f_2. The Structural equation model of self-regulation, resilience, and family environment on mathematics learning outcomes of junior high school students in Serang city can be seen in Figure 1.

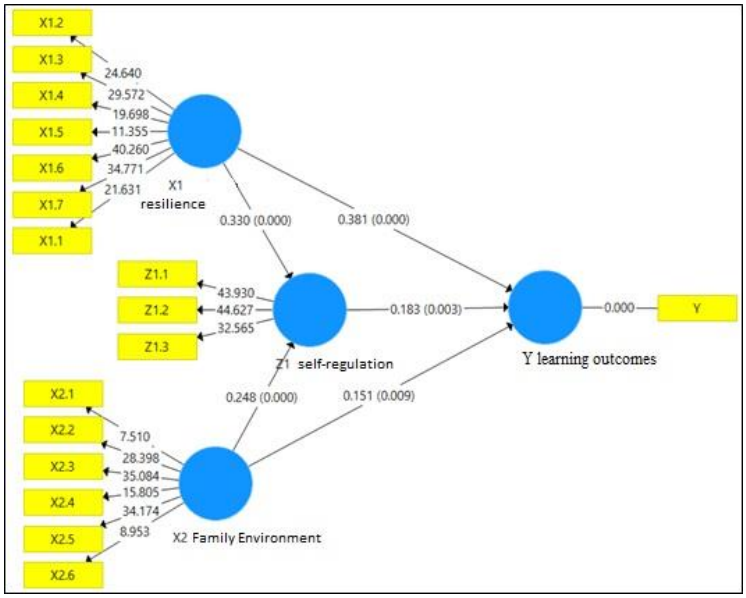

Figure 1. Structural equation model of self-regulation, resilience, and family environment on mathematics learning outcomes of junior high school students in Serang city

The structural model coefficient analysis determines which associations have a statistically significant impact, hence testing hypotheses. If the p-value is less than a (0.05), the relationship is significant. On the other hand, the association is not significant if the p-value is more than a (0.05). Test the hypothesis of the direct influence of the research model can be seen in Table 10.

Table 10. Test the hypothesis of the direct influence of the research model

Hypothesis	Path Coefficient	Origin Al Sample (O)	T Statistics	P Values	Adv
H1	X1 Resilience -> Y Learning Outcomes	0.381	6.561	0.000	Accepted
H2	X2 Family Environment -> Y Learning Outcomes	0.151	2.624	0.009	Accepted
H3	Z Self-Regulation -> Y Learning Outcomes	0.183	3.018	0.003	Accepted
H4	X1 Resilience -> Z Self-Regulation	0.330	5.475	0.000	Accepted
H5	X2 Family Environment -> Z Self-Regulation	0.248	4.513	0.000	Accepted

According to Table 10, resilience has a positive and significant effect on student learning outcomes, as evidenced by the p-value > a (0.05) with a significance of 0.000 <0.05. This means that Ho is rejected, and Ha is accepted, with a magnitude of 0.381. Based on the presentation of the results of data analysis in research findings, the conclusion is that the resilience variable has a positive and significant effect on learning outcomes. So, the higher the resilience, the higher the learning outcomes that students will achieve.

This study's results strengthen the research results from Layco (2020), which states that resilience significantly affects student learning outcomes. The resilience that exists in students

can contribute to their maximum learning outcomes. Because with resilience, students will be better able to increase their understanding of problems in the subject matter studied.

Resilience theory, presented by Reivich & Shatte (2002) and supported by Martin & Marsh (2006), explains that in education, resilience is a person's ability to face obstacles, stress, and other difficult situations in overcoming academic problems. Students with resilience essentially have a positive meaning for their learning progress, confidence, and a sense of optimism, and they can see positive opportunities for success so that they can survive in dealing with learning difficulties that exist in learning assignments. Several previous researchers revealed that resilience has a positive relationship and influence on learning outcomes (Mwangi et al., 2015). Therefore, maximum student learning outcomes will not be separated from the high resilience of student learning.

The results of testing the hypothesis that second this is the family environment has a positive and significant effect on student learning outcomes, as evidenced by the p-value > a (0.05) with a significance of 0.009 <0.05. This means that Ho is rejected and H2 is accepted, with an influence of 0.151. Based on the presentation of the results of data analysis in research findings, the conclusion is that family environment variables have a positive and significant effect on learning outcomes. So, the higher the family environment, the higher the learning outcomes that students will achieve.

Experts such as Wigfield and Schiefele revealed that student relationships with parents, peers, friends, teachers/mentors could affect student learning outcomes and motivation (Sacntrock, 2015). Student-parent relationships that can affect student motivation and learning success are demographic characteristics, parenting practices, and specific experiences at home. Parents and education are inseparable. Parental involvement in children's education will involve more participation at school and at home. The practice of parenting by parents is considered vital because it can also foster student interest and motivation and provide suitable learning outcomes.

The importance of the role of the family environment in supporting individuals to achieve high learning outcomes is supported by several previous research results, which show the results of their research that there is a positive influence of the family environment on student learning outcomes (Asmayani & Tanjung, 2020). The family environment is important because it is the closest learning environment for students to discuss, consult, be more creative, have high intelligence, and are always trained to overcome problems encountered when studying so that students will easily achieve optimal learning results. Conversely, when the family environment that students have is not good, then the ability of students will be reflected in not being skilled

at dealing with challenging learning assignments, having a lazy attitude due to a lack of encouragement and enthusiasm for learning, or giving up easily, which can result in less-than-optimal learning outcomes achieved by students.

Hypothesis testing results third is that self-regulation has a positive and significant effect on student learning outcomes, as indicated by the p-value > a (0.05) with a significance of 0.003 <0.05, with a large influence of 0.183. The results of this calculation indicate that the relationship between self-regulation and student learning outcomes is positive. This means that Ho is rejected and H3 is accepted. Based on the presentation of the results of data analysis in research findings, the conclusion is that self-regulation variables have a positive and significant effect on learning outcomes. Thus, the higher the self-regulation, the higher the learning outcomes that students will achieve.

The Bandura concept places humans as individuals who can manage themselves when learning (self-regulated learning), influencing behavior by regulating the environment and creating cognitive support (Alwisol, 2019). Zimmerman also stated that self-regulation is one factor that influences learning outcomes, where individuals will obtain satisfactory learning outcomes when they are aware of and know how to learn effectively (Shunk & Zimmerman, 2003). Zimmerman describes a self-regulation technique that allows people to systematically activate their emotions, behavior, and thought processes to achieve learning objectives. Self-regulatory learners convert their mental aptitudes into academic techniques and skills. Phases of planning, performance/volitional control, and self-reflection are used to accomplish this. According to Zimmerman's information processing theory, self-regulation is commonly interpreted as metacognitive awareness, which encompasses task knowledge such as procedural knowledge, competence, interests, and self-attitude (Shunk & Zimmerman, 2003).

The results of this study strengthen the results of research from several previous researchers who showed that self-regulation has a positive relationship and influence on student learning outcomes (Grijalva-Quiñonez et al., 2020; Khan et al., 2020). Based on the previous explanation, self-regulation and learning outcomes have a positive relationship. With a fairly good category of student self-regulation, it can improve learning outcomes.

The results of testing the hypothesis that fourth is that resilience has a positive and significant effect on student self-regulation, as evidenced by the p-value > a (0.05) with a significance of 0.000 <0.05. This means that Ho is rejected and H4 is accepted, with an influence of 0.330. Based on the presentation of the results of data analysis in the research findings, the conclusion is that the resilience variable has a positive and significant effect on

self-regulation. So, the higher the resilience, the higher the self-regulation that students will achieve.

The research results obtained by researchers reinforce the results of research from Mohan & Verma (2020), which state that resiliency or resilience to learning proves to have significant implications that by using independent learning strategies, students develop various skills, such as effort, perseverance, planning, and academic work. Resilience is positively correlated with self-regulated learning or self-regulation. In line with the findings of previous researchers, Artuch-Garde et al. (2017) found that self-regulation is the most important protective factor in resilience (learning resilience) that students can cultivate. Learning from learning mistakes and resilience is a significant predictor of maintaining better self-regulation.

The results of the analysis show that resilience has a positive effect on students' self-regulation. This is supported by previous research by Mitchell et al. (2019) on resilience and self-regulation. The findings of his research indicate that there is a positive relationship and influence between resilience and student self-regulation. The results of his research are supported by the findings of Choe et al. (2013), who also found a significant effect of student self-regulation in learning with high resilience abilities. Resilience is proven to increase student self-regulation because high resilience has more positive emotions that are obtained from expectations and student personal satisfaction related to individual student success in dealing with academic assignment problems. This is similar to research by Pillay et al. (2022), which explains that resilience or learning resilience positively influences self-regulation. Resilience has a positive effect on self-regulation. With a high resilience category, students can optimally increase self-regulation in their learning.

The findings of the results of hypothesis testing are that the family environment has a positive and significant effect on student self-regulation, as evidenced by the p-value > a (0.05) with a significance of 0.000 <0.05. This means that Ho is rejected and H5 is accepted, with an influence of 0.248. Based on the presentation of the results of data analysis in the research findings, the conclusion is that family environment variables have a positive and significant effect on self-regulation. So, the higher the family environment, the higher the self-regulation that students will achieve.

Theory of Albert Bandura social cognitive or social cognitive theory explains that social or environmental factors influence self-regulation, seeking social assistance, and environmental structuring (Lesilolo, 2018). Seeking social assistance is an effort to seek or ask for help from peers and other people when encountering learning difficulties. Ability to seek social assistance This is a self-initiative in getting help from friends or other people when experiencing learning

difficulties, which can affect the learning process. Environmental structuring or managing the environment is an attempt to regulate the learning environment to make learning easier and more comfortable (Magno, 2013).

Several studies have proven the importance of the role of the family environment in educating children. Parents contribute substantially to developing changes in children's behavior, including learning. Thus, it positively affects individual self-regulation in learning (Kardhiravan, 2011). The results of this study are also in line with previous researchers Oloye & Flouri (2020), many of whom proved that students' self-regulation level is related to the level of their family environment.

The family has a role in shaping the culture and behavior of the child's educational system. It is from the family that individual student education begins. In addition, the family is also a place for gathering, discussing, sharing, and socializing among all its members. The atmosphere of the family environment can also be a benchmark in fostering self-regulation for more productive independent learning. In this case, the family environment supports the individual in dealing with all aspects of learning, including completing planned tasks to achieve the goals or targets. Hypothesis test calculations are described in Table 11.

Table 11. Test the indirect effect hypothesis of the research model

Hypothesis	Path Coefficient	Original Sample (O)	T Statistics	P Values	Adv
H6	X1 Resilience -> Z Self-Regulation -> Y Learning Outcomes	0.061	2.444	0.015	Accepted
H7	X2 Family Environment -> Z Self-Regulation -> Y Learning Outcomes	0.046	2.437	0.015	Accepted

According to Table 11, the sixth hypothesis is that resilience influences student learning outcomes indirectly through the mediation of self-regulation. The significance of 0.000 <0.05 indirectly proves the magnitude of the effect. The calculation results show that the magnitude of the influence of resilience on learning outcomes indirectly through the mediation of self-regulation has a significance value of 0.015 <0.05. This value can be seen to have a significant positive effect. Then H6 is accepted, and H0 is rejected, with a large influence of 0.061%. This means that resilience indirectly affects student learning outcomes through self-regulation. The positive sign indicates that the relationship between variables goes in one direction, where the better the student's resilience, the better the learning outcomes indirectly achieved through self-regulation.

One feasible way to maximize student learning outcomes namely setting goals, doing practical assignments, and understanding the importance of self-regulation to overcome unavoidable learning obstacles that will support student resilience as long as they set the desired success and achievement. The theory of self-regulation in this study is based on social cognitive theory or social cognitive theory Bandura, which places humans as individuals who can regulate themselves (self-regulated learning), influencing behavior by regulating the environment, creating cognitive support, and providing consequences for one's behavior (Alwisol, 2019). Self-regulation shows many benefits that are formed through effort, including growing resilience and strength. Previous researchers stated that academics would be encouraged by their learning abilities by managing effective independent learning (Artuch-Garde et al., 2017).

The results of testing the hypothesis that seventh this is the family environment influences student learning outcomes directly and indirectly through the mediation of self-regulation. The calculation results show that a significance of 0.000 <0.05 indirectly proves the influence of the family environment on student learning outcomes. The calculation results show that the influence of the family environment on learning outcomes indirectly through the mediation of self-regulation has a significance value of 0.015 <0.05. This value can be seen to have a significant positive effect. Then H7 is accepted, and H0 is rejected, with a magnitude of 0.046. This means that the family environment indirectly influences student learning outcomes through self-regulation. The positive sign indicates that the relationship between variables goes in one direction, where the better the student's family environment, the better the learning outcomes indirectly achieved through self-regulation.

Based on the research results, it is known that the student's family environment determines self-regulation. This is because increased self-regulation in students is closely related to the family environment owned by students. The family environment is an environment other than school that supports children's education in words and deeds (Rahayu & Trisnawati, 2021). The involvement of the family environment is a real form of family relationship with students. Family plays an important role in cognitive development. Emotional, social, and collaborative work between students and parents impacts academic activities (Hakyemez, 2015).

This study's results strengthen the research results from previous researchers who showed that self-regulation mediates the influence of the family environment on learning outcomes (Freddy et al., 2021; Lau & Williams, 2022). The research hypothesis can be accepted based on the presentation of the data analysis and research findings. Thus, in the previous discussion, it can be seen that indirectly, self-regulation partially mediates the influence of the family

environment on the learning outcomes of class VII junior high school students in Serang City. The results of the regression analysis hierarchy can be seen in Table 12.

Table 12. The results of the regression analysis hierarchy

Model	R	R^2	Adjusted R^2	Std. Error	Change Statistics				
					R^2 Change	F Change	df1	df2	Sig.
1 (X1, X2)	.493	.243	.238	8.68512	.243	52.729	2	329	.000
2 (X1, X2, Z)	.522	.272	.266	8.52738	.029	13.284	1	328	.000

Table 12 hypothesizes that eight of these, resilience, family environment, and regulations, affect learning outcomes. The calculation results show that a significance of 0.000 <0.05 indirectly proves the influence of the family environment on student learning outcomes. The calculation results show that the influence of the family environment on learning outcomes indirectly through the mediation of self-regulation has a significance value of 0.000 <0.05. Based on the test results in the table above, it can be decided that H8 is accepted and Ho is rejected, with an influence of 0.272. This means that resilience, family environment, and self-regulation affect student learning outcomes.

This study's results strengthen the research results from previous researchers who showed that resilience, family environment, and self-regulation affect learning outcomes (Galizty, 2022). The research hypothesis can be accepted based on the presentation of the data analysis and research findings. Thus, in the previous discussion, resilience, family environment, and self-regulation affect the learning outcomes of class VII students at a public junior high school in Serang City mathematics.

CONCLUSION

Based on the research results and discussion in the previous chapter, it can be concluded that the structural equation model between resilience, family environment, and self-regulation of mathematics learning outcomes has a moderate accuracy estimate of 27.2%. Other factors outside the research model influence the remaining 72.8%. The specific test is as follows.

Resilience affects the learning outcomes of class VII students of State Junior High Schools in Serang City by 0.381. The higher the resilience, the higher the student's mathematics learning outcomes. The family environment affects the learning outcomes of class VII students of State Junior High Schools in Serang City by 0.151. The higher the learning environment, the higher the students' mathematics learning outcomes. Self-regulation affects the learning outcomes of class VII students of State Middle Schools in Serang City by 0.183. The higher the self-regulation, the higher the students' mathematics learning outcomes. Resilience affects the ability of self-regulation of class VII students of State Junior High Schools in Serang City by 0.330. The higher the resilience, the higher the self-regulation of students. The family

environment affects the ability of self-regulation of class VII students of State Junior High Schools in Serang City by 0.248. The higher the family environment, the higher the self-regulation of students.

Resilience affects the learning outcomes of class VII students of Junior high schools in Serang City indirectly through the ability of students' self-regulation of 0.061. The family environment influences the learning outcomes of class VII students of public junior high school in Serang City indirectly through the ability of students' self-regulation of 0.046. Resilience, family environment, and self-regulation abilities affect the learning outcomes of class VII students of public junior high schools in Serang City by 0.272.

SUGGESTIONS

Based on the research results described, several recommendations can be used as material for educational institutions to improve the quality of education and the smooth running of the teaching and learning process. A teacher should actively participate in enhancing learning models or methods that will be presented to students so that they can help and provide motivation and information on how to improve student regulation and resilience related to aspects of knowledge and student personality. Schools should also be able to work with students' parents, especially regarding the learning process, to help students control themselves in optimal learning activities.

For future researchers it is hoped that future researchers can dig more carefully and explore resilience, family environment, and student self-regulation in public junior high schools other than in Serang City so that they can be used as a comparison with the results of this study, and can conduct more in-depth research on the variables of resilience, family environment, and student self-regulation by adding other variables that affect learning outcomes besides the variables that have been studied by the author, both external and internal factors.

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